The Regulations of Connecticut State Agencies are amended by adding section 22a-153-2, as follows:

(NEW)

Sec. 22a-153-2. Standards for protection against radiation.

(a) Definitions. For the purposes of this section:

(1) "Annual limit on intake" or "ALI" means the derived limit for the amount of radioactive material taken into the body of an adult worker by inhalation or ingestion in a year. ALI is the smaller value of intake of a given radionuclide in a year by the reference man that would result in a committed effective dose equivalent of 0.05 Sv (5 rem) or a committed dose equivalent of 0.5 Sv (50 rem) to any individual organ or tissue. ALI values for intake by ingestion and by inhalation of selected radionuclides are given in Table I,Columns 1 and 2, of Appendix B.

(2) "Class," "lung class" or "inhalation class" means an assignment under a classification scheme for inhaled material according to its rate of clearance from the pulmonary region of the lung. Materials are classified as D, W or Y, according to the clearance half times as follows: for Class D, Days, of less than 10 days; for Class W,Weeks, from 10 to 100 days; and for Class Y, Years, of greater than 100 days. For purposes of these regulations, “lung class” and “inhalation class” are equivalent terms.

(3) "Declared pregnant woman" means a woman who has voluntarily informed her employer, in writing, of her pregnancy and the estimated date of conception. The term applies to a declared pregnant woman until such woman withdraws the declaration in writing or is no longer pregnant.

(4) "Derived air concentration" or "DAC" means the concentration of a given radionuclide in air which, if breathed by the reference man for a working year of 2,000 hours under conditions of light work, results in an intake of one ALI. , As used in this section, the condition of light work is an inhalation rate of 1.2 cubic meters of air per hour for 2,000 hours in a year.

(5) "Derived air concentration-hour" or "DAC-hour" means the product of the concentration of radioactive material in air, expressed as a fraction or multiple of the derived air concentration for each radionuclide, and the time of exposure to that radionuclide, in hours. A licensee or registrant may take 2,000 DAC-hours to represent one ALI, equivalent to a committed effective dose equivalent of 0.05 Sv (5 rem).

(6) "Dosimetry processor" means an individual or an organization that processes and evaluates individual monitoring devices in order to determine the radiation dose delivered to the monitoring devices.

(7) "Month" means a calendar month, one twelve month division of a year.

(8) "Nonstochastic effect" or "deterministic effect" means a health effect, the severity of which varies with the dose and for which a threshold is believed to exist. Radiation-induced cataract formation is an example of a nonstochastic effect.
"Planned special exposure" means an infrequent exposure to radiation, separate from and in addition to the annual occupational dose limits.

(9) "Quarter" means a period of time equal to one-fourth of the year observed by the licensee, approximately 13 consecutive weeks, providing that the beginning of the first quarter in a year coincides with the starting date of the year and that no day is omitted or duplicated in consecutive quarters.

(10) "Reference man" means a hypothetical aggregation of human physical and physiological characteristics determined by international consensus for use by researchers and public health employees to standardize results of experiments and to relate biological insult to a common base. A description of the reference man is contained in the International Commission on Radiological Protection report, ICRP Publication 23, "Report of the Task Group on Reference Man."

(11) "Respiratory protective equipment" means an apparatus, such as a respirator, used to reduce an individual's intake of airborne radioactive materials.

(12) "Sanitary sewerage" means a system of public sewers for carrying off waste water and refuse, but excluding sewage treatment facilities, septic tanks and leach fields owned or operated by the licensee or registrant.

(13) "Stochastic effect" or "probabilistic effect" means a health effect that occurs randomly and for which the probability of the effect occurring, rather than its severity, is assumed to be a linear function of dose without threshold. Hereditary effects and cancer incidence are examples of stochastic effects.

(14) "Very high radiation area" means an area, accessible to individuals, in which radiation levels could result in an individual receiving an absorbed dose in excess of five Gy (500 rad) in one hour at one meter from a source of radiation or from any surface that the radiation penetrates.

(15) "Weighting factor" or "w_T" for an organ or tissue (T) means the proportion of the risk of stochastic effects resulting from irradiation of that organ or tissue to the total risk of stochastic effects when the whole body is irradiated uniformly. For calculating the effective dose equivalent, the values of w_T are as defined in Table 1:

Table 1. Organ Dose Weighting Factors

Organ or Tissue (T)	w_T
Gonads	0.25
Breast	0.15
Red bone marrow	0.12
Lung	0.12
Thyroid	0.03
Bone surfaces	0.03
Remainder	0.30[a/]
Whole Body	1.00[b/]

[a/] 0.30 results from 0.06 for each of 5 "remainder" organs, excluding the skin and the lens of the eye, that receive the highest doses.

[b/] For the purpose of weighting the external whole body dose, for adding it to the internal dose, a single weighting factor, $w_T = 1.0$, has been specified. The use of other weighting

factors for external exposure will be approved on a case-by-case basis until such time as specific guidance is issued.

(b) Applicability.

(1) This section applies to persons licensed or registered by the Commissioner to receive, possess, use, transfer or dispose of sources of radiation.

(2) The exposure and dose limits in this section do not apply to doses resulting from:

(A) Background radiation;

(B) Exposure of patients to radiation for the purpose of medical diagnosis or therapy; or

(C) Exposure from voluntary participation in medical research programs.

(c) Implementation.

Any condition in a license or registration issued prior to the effective date of this section that is more restrictive than this section shall remain in force until there is an amendment or renewal of the license or registration.

(d) Radiation protection programs.

(1) No later than one year from the effective date of this section, each licensee or registrant shall develop a site-specific radiation protection program sufficient to meet the requirements of this section.

(2) In its radiation protection program, the licensee or registrant shall use, to the extent practicable, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and public doses that are as low as is reasonably achievable.

(3) The radiation protection program shall be described in a manual with an index. Such manual shall be updated on an annual basis. The manual shall include, but not be limited to, the following information:

(A) A summary of the applicable occupation and public dose limits;

(B) Procedures for operating the facility within the dose limits established under this section;

(C) Procedures for monitoring exposure; and

(D) Procedures for reporting and recordkeeping consistent with subsection (n)(2) of this section.

(4) The licensee or registrant shall, at intervals not to exceed thirteen (13) months, review the radiation protection program content and implementation and update the manual as necessary to meet the requirements of this section.

(5) The radiation protection program manual shall be maintained in a location readily accessible to all workers and shall be available for inspection by the Commissioner upon request.

(e) Occupational dose limits.

(1) Occupational Dose Limits for Adults. A licensee or registrant shall **limit** the occupational dose to individual adults according to the limits in this subdivision, calculated according to this subsection:

(A) An annual limit, which is the more limiting of:

(i) The total effective dose equivalent equal to 0.05 Sv (5 rem), or

(ii) The sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 0.5 Sv (50 rem); and

(B) The annual limits to the lens of the eye, to the skin, and to the extremities, which are:

(i) A lens dose equivalent of 0.15 Sv (15 rem), and

(ii) A shallow dose equivalent of 0.5 Sv (50 rem) to the skin or to any extremity;

(2) A licensee or registrant shall calculate doses received in excess of the annual limits, by subtracting doses received during accidents, emergencies and planned special exposures, from the limits for planned special exposures that the individual may receive during the current year and during the individual's lifetime.

(3) A licensee or registrant shall calculate the assigned deep dose equivalent and shallow dose equivalent for the portion of the body receiving the highest exposure, as follows:

(A) The deep dose equivalent, lens dose equivalent and shallow dose equivalent may be assessed from surveys or other radiation measurements for the purpose of demonstrating compliance with the occupational dose limits, if the individual monitoring device was not in the region of highest potential exposure, or the results of individual monitoring are unavailable; or

(B) When a protective apron is worn while working with medical fluoroscopic equipment and monitoring is conducted as specified in h(2)(A)(iv), the effective dose equivalent for external radiation shall be determined as follows:

(i) When only one individual monitoring device is used and it is located at the neck outside the protective apron, the reported deep dose equivalent shall be the effective dose equivalent for external radiation, and

(ii) When individual monitoring devices are worn, both under the protective apron at the waist and outside the protective apron at the neck, the effective dose equivalent calculation shall be calculated using the American National Standards Institute (ANSI) for performing multiple dosimetry, provided the following are addressed:

(1) A statement that the weighting factors will be used only for physicians performing cardiology or interventional radiology using fluoroscopy.

(2) The date the weighting factors will be implemented. They cannot be used retroactively.

(3) A statement that personnel who have their doses calculated using this method will be informed annually of the original dosimeter measurements and the process used to determine their doses of record.

(4) DAC and ALI values [are specified in Table I of Appendix B] and may be used to determine the individual's dose and to demonstrate compliance with the occupational dose limits.

(5) Notwithstanding the annual dose limits of subdivision (1) of this subsection, a licensee or registrant shall limit the soluble uranium intake by an individual to 10 milligrams in a week in consideration of chemical toxicity. [See footnote [c/] of Appendix B.]

(6) A licensee or registrant shall reduce the dose that an individual may be allowed to receive in the current year by the amount of occupational dose received while employed by any other person during the current year.

(7) Compliance with requirements for summation of external and internal doses. If a licensee or registrant is required to monitor pursuant to both subsections (h)(2)(A) and (h)(2)(B) of this section, such licensee or registrant shall demonstrate compliance with the dose limits by summing external and internal doses. If the licensee or registrant is required to monitor only pursuant to subsection (h)(2)(A) of this section or only pursuant to subsection (h)(2)(B) of this section, then summation is not required to demonstrate compliance with the dose limits. The licensee or registrant may demonstrate compliance with the requirements for summation of external and internal doses pursuant to subparagraphs (A) through (C) of this subdivision. The dose equivalents for the lens of the eye, the skin and the extremities are not included in the summation, but are subject to separate limits.

(A) Intake by inhalation. If the only intake of radionuclides is by inhalation, the total effective dose equivalent limit is not exceeded if the sum of the deep dose equivalent divided by the total effective dose equivalent limit, and one of the following, does not exceed unity:

(i) The sum of the fractions of the inhalation ALI for each radionuclide,

(ii) The total number of derived air concentration-hours (DAC-hours) for all radionuclides divided by 2,000, or

(iii) The sum of the calculated committed effective dose equivalents to all significantly irradiated organs or tissues (T) calculated from bioassay data using appropriate biological models and expressed as a fraction of the annual limit. For purposes of this requirement, an organ or tissue is deemed to be significantly irradiated if, for that organ or tissue, the product of the weighting factors, w_T, and the committed dose equivalent, $H_{T,50}$, per unit intake is greater than 10 percent of the maximum weighted value of $H_{T,50}$, that is, $w_T H_{T,50}$, per unit intake for any organ or tissue;

(B) Intake by oral ingestion. If the occupationally exposed individual receives an intake of radionuclides by oral ingestion greater than ten (10) percent of the applicable oral ALI, the licensee or registrant shall account for this intake and include it in demonstrating compliance with the limits.

(C) Intake through wounds or absorption through skin. A licensee or registrant shall evaluate and, to the extent practical, account for intakes through wounds or skin absorption. The intake through intact skin has been included in the calculation of DAC for hydrogen-3 and does not need to be evaluated or accounted for pursuant to this subparagraph.

(8) Each licensee and registrant shall determine the external dose from airborne radioactive material as follows:

(A) Include the contribution to the deep dose equivalent, lens dose equivalent and shallow dose equivalent from external exposure to the radioactive cloud. [See Appendix B, footnotes [a/] and [b/]]; and

(B) When the airborne radioactive material includes radionuclides other than noble gases or if the cloud of airborne radioactive material is not relatively uniform, airborne radioactivity measurements and DAC values shall not be used as the primary means to assess the deep dose equivalent. The determination of the deep dose equivalent to an individual shall be based upon measurements using instruments or individual monitoring devices.

(9) A licensee or registrant shall determine internal exposure according to subparagraphs (A) through (H) of this subdivision.

(A) For purposes of assessing dose used to determine compliance with occupational dose equivalent limits, a licensee or registrant shall, as required pursuant to subsection (h)(2) of this section, take suitable and timely measurements of:

(i) Concentrations of radioactive materials in air in work areas,

(ii) Quantities of radionuclides in the body,

(iii) Quantities of radionuclides excreted from the body, or

(iv) Combinations of these measurements;

(B) Unless respiratory protective equipment is used**,** as provided in subsection (j)(3) of this section, or the assessment of intake is based on bioassays, the licensee or registrant shall assume that an individual inhales radioactive material at the airborne concentration in which the individual is present.

(C) When specific information on the physical and biochemical properties of the radionuclides taken into the body or the behavior of the material in an individual is known, the licensee or registrant may:

(i) Use that information to calculate the committed effective dose equivalent, and, if used, the licensee or registrant shall document that information in the individual's record,

(ii) Upon prior approval of the Commissioner, adjust the DAC or ALI values to reflect the actual physical and chemical characteristics of airborne radioactive material, for example, aerosol size distribution or density, and

(iii) Separately assess the contribution of fractional intakes of Class D, W, or Y compounds of a given radionuclide to the committed effective dose equivalent; [See Appendix B.]

(D) If the licensee or registrant chooses to assess intakes of Class Y material using the measurements given in subsections (e)(9)(A)(ii) or (e)(9)(A)(iii) of this section, the licensee or registrant may delay the recording and reporting of the assessments for periods up to seven (7) months, unless otherwise required by subsections (o)(2) or (o)(3) of this section. This delay permits the licensee or registrant to make additional measurements basic to the assessments.

(E) If the identity and concentration of each radionuclide in a mixture are known, the fraction of the DAC applicable to the mixture for use in calculating DAC-hours shall be either:

(i) The sum of the ratios of the concentration to the appropriate DAC value, that is, D, W, or Y from [Appendix B] for each radionuclide in the mixture, or

(ii) The ratio of the total concentration for all radionuclides in the mixture to the most restrictive DAC value for any radionuclide in the mixture;

(F) If the identity of each radionuclide in a mixture is known, but the concentration of one or more of the radionuclides in the mixture is not known, the DAC for the mixture shall be the most restrictive DAC of any radionuclide in the mixture.

(G) When a mixture of radionuclides in air exists, a licensee or registrant may disregard certain radionuclides in the mixture if:

(i) The licensee or registrant uses the total activity of the mixture in demonstrating compliance with the dose limits in subdivision (e) of this

section and in complying with the monitoring requirements in, subsection (h)(2)(B) of this section,

(ii) The concentration of any radionuclide disregarded is less than 10 percent of its DAC, and

(iii) The sum of these percentages for all of the radionuclides disregarded in the mixture does not exceed 30 percent;

(H) When determining the committed effective dose equivalent, the following information may be considered:

(i) In order to calculate the committed effective dose equivalent, the licensee or registrant may assume that the inhalation of one ALI, or an exposure of 2,000 DAC-hours, results in a committed effective dose equivalent of 0.05 Sv (5 rem) for radionuclides that have their ALIs or DACs based on the committed effective dose equivalent, and

(ii) For an ALI and the associated DAC determined by the nonstochastic organ dose limit of 0.5 Sv (50 rem), the intake of radionuclides that would result in a committed effective dose equivalent of 0.05 Sv (5 rem), that is, the stochastic ALI, is listed in parentheses [in Table I of Appendix B]. The licensee or registrant may, as a simplifying assumption, use the stochastic ALI to determine committed effective dose equivalent. However, if the licensee or registrant uses the stochastic ALI, the licensee or registrant shall also demonstrate that the limit in subparagraph (1)(A)(ii) of this subsection is met,

(10) Determination of Prior Occupational Dose. A licensee or registrant shall determine the prior occupational dose as follows:

(A) For each individual who may enter the licensee's or registrant's restricted area and is likely to receive, in a year, an occupational dose requiring monitoring pursuant to subsection (h)(2) of this section, the licensee or registrant shall make the following determinations according to the requirements of this subdivision:

(i) Determine the occupational radiation dose received during the current year, and

(ii) Attempt to obtain the records of lifetime cumulative occupational radiation dose;

(B) Prior to permitting an individual to participate in a planned special exposure, a licensee or registrant shall determine:

(i) The internal and external doses from all previous planned special exposures, and

(ii) All doses in excess of the limits, including doses received during accidents and emergencies, received during the lifetime of the individual;

(C) In complying with the requirements of subparagraph (A) of this subdivision, a licensee or registrant may:

(i) Accept, as a record of the occupational dose that the individual received during the current year, a written signed statement from the individual or from the individual's most recent employer for work involving radiation exposure that discloses the nature and the amount of any occupational dose that the individual received during the current year,

(ii) Accept, as the record of lifetime cumulative radiation dose, an up-to-date Agency Form Y or equivalent, signed by the individual and countersigned by an appropriate official of the most recent employer for work involving radiation exposure, or the individual's current employer, if the individual is not employed by the licensee or registrant, and

(iii) Obtain reports of the individual's dose equivalent from the most recent employer for work involving radiation exposure, or the individual's current employer, if the individual is not employed by the licensee or registrant, by telephone, telegram, facsimile, or letter. The licensee or registrant shall request a written verification of the dose data if the authenticity of the transmitted report cannot be established;

(D) The licensee or registrant shall record the exposure history as required by subparagraph (A) of this subdivision, as follows:

(i) On Agency Form Y, or other clear and legible record, of all the information required on that form. The form or record shall show each period in which the individual received occupational exposure to radiation or radioactive material and shall be signed by the individual who received the exposure. For each period for which the licensee or registrant obtains reports, the licensee or registrant shall use the dose shown in the report in preparing Agency Form Y or equivalent. For any period in which the licensee or registrant does not obtain a report, the licensee or registrant shall place a notation on Agency Form Y or equivalent indicating the periods of time for which data are not available, and

(ii) Licensees or registrants are not required to partition historical dose between external dose equivalent(s) and internal committed dose equivalent(s). Occupational exposure histories obtained and recorded on Agency Form Y or equivalent before the effective date of this section that do not include effective dose equivalent may be used in the absence of specific information on the intake of radionuclides by the individual;

(E) If the licensee or registrant is unable to obtain a complete record of an individual's current and previously accumulated occupational dose, the licensee or registrant shall assume:

(i) In establishing administrative controls pursuant to subsection (e)(6) for the current year, that the allowable dose limit for the individual is reduced by

12.5 mSv (1.25 rem) for each quarter for which records were unavailable and the individual was engaged in activities that could have resulted in occupational radiation exposure, and

(ii) That the individual is not available for planned special exposures;

(F) The licensee or registrant shall retain the records on Agency Form Y or equivalent until the Agency terminates each pertinent license or registration requiring this record. The licensee or registrant shall retain records used in preparing Agency Form Y or equivalent for five (5) years after the record is made.

(11) Planned special exposures. A licensee or registrant may authorize an adult worker to receive doses in addition to and accounted for separately from the doses received under the limits specified subdivisions (1) through (6) of this subsection provided that each of the following conditions is satisfied:

(A) The licensee or registrant authorizes a planned special exposure only in an exceptional situation when alternatives that might avoid the higher exposure are unavailable or impractical;

(B) The licensee or registrant and employer, if the employer is not the licensee or registrant, specifically authorizes the planned special exposure, in writing, before the exposure occurs;

(C) Before a planned special exposure, the licensee or registrant ensures that each individual involved is:

(i) Informed of the purpose of the planned operation, and

(ii) Informed of the estimated doses and associated potential risks and specific radiation levels or other conditions that might be involved in performing the task, and

(iii) Instructed in the measures to be taken to keep the dose ALARA considering other risks that may be present;

(D) Prior to permitting an individual to participate in a planned special exposure, the licensee or registrant ascertains prior doses as required by subparagraph (10)(B) of this section during the lifetime of the individual for each individual involved;

(E) Subject to subdivision (2) of this subsection, the licensee or registrant shall not authorize a planned special exposure that would cause an individual to receive a dose from all planned special exposures and all doses in excess of the limits to exceed:

(i) The numerical values of any of the dose limits in subdivision (1) of this subsection in any year, and

(ii) Five times the annual dose limits in subdivision (1) of this subsection during the individual's lifetime;

(F) The licensee or registrant maintains records of the conduct of a planned special exposure in accordance with subsection (n)(6) of this section and submits a written report in accordance with subsection (o)(4) of this section;

(G) The licensee or registrant records the best estimate of the dose resulting from the planned special exposure in the individual's record and informs the individual, in writing, of the dose within 30 days from the date of the planned special exposure. The dose from planned special exposures shall not be considered in controlling future occupational dose of the individual pursuant to subdivision (1) of this subsection but shall be included in evaluations required by subparagraphs (D) and (E) of this subdivision;

(12) Occupational dose limits for minors. The annual occupational dose limits for minors are ten (10) percent of the annual occupational dose limits specified for adult workers subdivisions (1) through (6) of this subsection.

(13) Dose to an embryo/fetus. A licensee or registrant shall ensure that the dose to an embryo/fetus during the entire pregnancy, due to occupational exposure of a declared pregnant woman, does not exceed 5 mSv (0.5 rem), calculated as follows:

(A) The licensee or registrant shall make efforts to avoid substantial variation above a uniform monthly exposure rate to a declared pregnant woman so as to satisfy the occupational exposure limit of this subdivision;

(B) The dose to an embryo/fetus shall be taken as the sum of:

(i) The dose to the embryo/fetus from radionuclides in the embryo/fetus and radionuclides in the declared pregnant woman, and

(ii) The dose that is most representative of the dose to the embryo/fetus from external radiation, that is, in the mother's lower torso region**,** as follows:

(a) If multiple measurements have not been made, assignment of the highest deep dose equivalent for the declared pregnant woman shall be the dose to the embryo/fetus, in accordance with subparagraph (10)(C) of this subsection; or

(b) If multiple measurements have been made, assignment of the deep dose equivalent for the declared pregnant woman from the individual monitoring device that is most representative of the dose to the embryo/fetus shall be the dose to the embryo/fetus. Assignment of the highest deep dose equivalent for the declared pregnant woman to the embryo/fetus is not required unless that dose is also the most representative deep dose equivalent for the region of the embryo/fetus;

(C) If by the time the woman declares pregnancy to the licensee or registrant, the dose to the embryo/fetus has exceeded 4.5 mSv (0.45 rem), the licensee or registrant shall be deemed to be in compliance with occupational exposure limit of this

subdivision if the additional dose to the embryo/fetus does not exceed 0.5 mSv (0.05 rem) during the remainder of the pregnancy.

(f) Radiation dose limits for individual members of the public.

(1) Each licensee or registrant shall conduct operations to limit the dose received by individual members of the public as follows:

(A) Except as provided in subparagraph (D) of this subdivision, the total effective dose equivalent to individual members of the public from the licensed or registered operation shall not exceed 1 mSv (0.1 rem) in a year, exclusive of the dose contribution from the licensee's or registrant's disposal of radioactive material into sanitary sewerage;

(B) The dose in any unrestricted area from external sources shall not exceed 0.02 mSv (0.002 rem) in any one hour; and

(C) The total effective dose equivalent to individual members of the public from infrequent exposure to radiation from radiation machines shall not exceed five (5) mSv (0.5 rem).

(2) The dose limits of subdivision (1) of this subsection shall be determined as follows:

(A) If the licensee or registrant permits members of the public to have access to restricted areas, the limits for members of the public continue to apply to those individuals;

(B) A licensee, registrant or an applicant for a license or registration may apply for prior Commissioner authorization to operate up to an annual dose limit for an individual member of the public of 5 mSv (0.5 rem). Such application shall be submitted 120 days prior to operation in question in writing on a form provided by the Commissioner and shall include the following information:

(i) Demonstration of the need for and the expected duration of operations in excess of the limit in subdivision (1) of this subsection,

(ii) The licensee's or registrant's program to assess and control dose within the 5 mSv (0.5 rem) annual limit, and

(iii) The procedures to be followed to maintain the dose ALARA;

(C) In addition to the requirements of this section, a licensee or registrant subject to the provisions of EPA's generally applicable environmental radiation standards in 40 CFR 190 shall comply with those standards;

(D) The Commissioner may impose additional restrictions on radiation levels in unrestricted areas and on the total quantity of radionuclides that a licensee or registrant may release in effluents in order to restrict the collective dose;

(E) The licensee or registrant shall make surveys of radiation levels in unrestricted areas and radioactive materials in effluents released to unrestricted areas to demonstrate compliance with the dose limits for individual members of the public in subdivision (1) of this subsection;

(F) A licensee or registrant shall show compliance with the annual dose limit in subdivision (1) of this subsection by:

(i) Demonstrating by measurement or calculation that the total effective dose equivalent to the individual likely to receive the highest dose from the licensed or registered operation does not exceed the annual dose limit, or

(ii) Demonstrating that:

(a) The annual average concentrations of radioactive material released in gaseous and liquid effluents at the boundary of the unrestricted area do not exceed the values specified in Table II of Appendix B, and

(b) If an individual were continuously present in an unrestricted area, the dose from external sources would not exceed 0.02 mSv (0.002 rem) in an hour and 0.5 mSv (0.05 rem) in a year; and

(G) Upon approval from the Commissioner, the licensee or registrant may adjust the effluent concentration values in Appendix B, Table II, for members of the public, to take into account the actual physical and chemical characteristics of the effluents, such as aerosol size distribution, solubility, density, radioactive decay equilibrium and chemical form.

(g) Testing for leakage or contamination of sealed sources.

(1) The licensee or registrant in possession of any sealed source shall test such source for leaking or contamination according to the following requirements:

(A) Except as specified in subdivision (2) of this subsection each sealed source shall be tested for leakage or contamination and the test results received before the sealed source is put into use unless the licensee or registrant has a certificate from the transfer or indicating that the sealed source was tested within six months before transfer to the licensee or registrant;

(B) Each sealed source that is not designed to emit alpha particles shall be tested for leakage or contamination at intervals not to exceed 6 months or at alternative intervals approved by the Commissioner an Agreement State, a Licensing State or the NRC:

(i) In the event the applicant desires that the source or device be required to be tested for leakage of radioactive material at intervals longer than 6 months, he shall include in his application sufficient

information to demonstrate that such longer interval is justified by performance characteristics of the source or device or similar sources or devices and by design features that have a significant bearing on the probability or consequences of leakage of radioactive material from the source, and

(ii) In determining the acceptable interval for test of leakage of radioactive material, the Commissioner will consider information that includes, but is not limited to:

(1) primary containment or source capsule,

(2) protection of primary containment,

(3) method of sealing containment,

(4) containment construction materials,

(5) form of contained radioactive material,

(6) maximum temperature withstood during prototype tests,

(7) maximum pressure withstood during prototype tests,

(8) maximum quantity of contained radioactive material,

(9) radiotoxicity of contained radioactive material, and

(10) operating experience with identical sources or devices, or similarly designed and constructed sources or devices.

(C) Each sealed source that is designed to emit alpha particles shall be tested for leakage or contamination at intervals not to exceed three months or at alternative intervals approved by the Commissioner an Agreement State, a Licensing State or the NRC:

(ii) In the event the applicant desires that the source or device be required to be tested for leakage of radioactive material at intervals longer than 6 months, he shall include in his application sufficient information to demonstrate that such longer interval is justified by performance characteristics of the source or device or similar sources or devices and by design features that have a significant bearing on the probability or consequences of leakage of radioactive material from the source, and

(iii) In determining the acceptable interval for test of leakage of radioactive material, the Commissioner will consider information that includes, but is not limited to:

(1) primary containment or source capsule,

(2) protection of primary containment,

(3) method of sealing containment,

(4) containment construction materials,

(5) form of contained radioactive material,

(6) maximum temperature withstood during prototype tests,

(7) maximum pressure withstood during prototype tests,

(8) maximum quantity of contained radioactive material,

(9) radiotoxicity of contained radioactive material, and

(10) operating experience with identical sources or devices or similarly designed and constructed sources or devices.

(D) For each sealed source that is required to be tested for leakage or contamination, at any other time there is reason to suspect that the sealed source might have been damaged or might be leaking, the licensee or registrant shall assure that the sealed source is tested for leakage or contamination before further use;

(E) Tests for leakage for all sealed sources, except brachytherapy sources manufactured to contain radium, shall be capable of detecting the presence of 185 Bq (0.005 μCi) of radioactive material on a test sample. Test samples shall be taken from the sealed source or from the surfaces of the container in which the sealed source is stored or mounted on which one might expect contamination to accumulate. For a sealed source contained in a device, test samples are obtained when the source is in the "off" position;

(F) The test for leakage for brachytherapy sources manufactured to contain radium shall be capable of detecting an absolute leakage rate of 37 Bq (0.001 μCi) of radon-222 in a 24 hour period when the collection efficiency for radon-222 and its daughters has been determined with respect to collection method, volume and time; and

(G) Tests for contamination from radium daughters shall be taken on the interior surface of brachytherapy source storage containers and shall be capable of detecting the presence of 185 Bq (0.005 μCi) of a radium daughter which has a half-life greater than four days.

(2) Notwithstanding subsection (b)(1) of this section**,** a licensee or registrant is not required to perform testing for leakage or contamination on the following sealed sources:

(A) Sealed sources containing only radioactive material with a half-life of less than thirty (30) days;

(B) Sealed sources containing only radioactive material as a gas;

(C) Sealed sources containing 3.7 MBq (100 μCi) or less of beta or photon-emitting material or 370 kBq (10 μCi) or less of alpha-emitting material;

(D) Sealed sources containing only hydrogen-3;

(E) Seeds of iridium-192 encased in nylon ribbon; and

(F) Sealed sources, except teletherapy and brachytherapy sources, which are stored, not being used and identified as in storage. The licensee or registrant shall, however, test each such sealed source for leakage or contamination and receive the test results before any use or transfer unless it has been tested for leakage or contamination within six (6) months before the date of use or transfer.

(3) Tests for leakage or contamination from sealed sources shall be performed by persons specifically authorized by the Commissioner, an Agreement State, a Licensing State, or the Nuclear Regulatory Commission to perform such services.

(4) Test results shall be recorded in units of becquerel or microcurie and maintained for inspection by the Commissioner. Records of test results for sealed sources shall be made pursuant to subsection (n)(4) of this section.

(5) The following shall be considered evidence that a sealed source is leaking:

(A) The presence of 185 Bq (0.005 μCi) or more of removable contamination on any test sample;

(B) Leakage of 37 Bq (0.001 μCi) of radon-222 per 24 hours for brachytherapy sources manufactured to contain radium; and

(C) The presence of removable contamination resulting from the decay of 185 Bq (0.005 μCi) or more of radium.

(6) The licensee or registrant shall immediately withdraw a leaking sealed source from use and shall take action to prevent the spread of contamination. The leaking sealed source shall be repaired or disposed of in accordance with this section.

(7) Reports of test results for leaking or contaminated sealed sources shall be made pursuant to subsection (o)(7) of this section.

(h) Surveys and monitoring.

(1) General requirements.

(A) Each licensee or registrant shall make, or cause to be made, surveys that:

(i) Are necessary for the licensee or registrant to comply with this section, and

(ii) Are necessary under the circumstances to evaluate:

(a) Radiation levels,

(b) Concentrations or quantities of radioactive material, and

(c) The potential radiological hazards that could be present;

(B) The licensee or registrant shall ensure that instruments and equipment used for quantitative radiation measurements, such as dose rate and effluent monitoring, are calibrated at intervals not to exceed thirteen (13) months for the radiation measured, except when a more frequent interval is specified in another applicable part of these regulations or license condition;

(C) All personnel dosimeters, except for direct and indirect reading pocket ionization chambers and those dosimeters used to measure the dose to any extremity, that require processing to determine the radiation dose and that are used by licensees and registrants to comply with subsections (e)(1) through (e)(6) of this section, other applicable provisions of the Regulations of Connecticut State Agencies or conditions specified in a license or registration shall be processed and evaluated by a dosimetry processor, as follows:

(i) Holding current personnel dosimetry accreditation from the National Voluntary Laboratory Accreditation Program of the National Institute of Standards and Technology, and

(ii) Approved in this accreditation process for the type of radiation or in the National Voluntary Laboratory Accreditation Program that most closely approximates the type of radiation or radiations for which the individual wearing the dosimeter is monitored.

(2) Conditions requiring individual monitoring of external and internal occupational dose. Each licensee or registrant shall monitor exposures from sources of radiation at levels sufficient to demonstrate compliance with the occupational dose limits of this section. As a minimum:

(A) Each licensee or registrant shall monitor occupational exposure to radiation and shall supply and require the use of individual monitoring devices by the following individuals:

(i) Adults likely to receive, in one year from sources external to the body, a dose in excess of ten (10) percent of the limits in subsection (e)(1) of this section,

(ii) Minors and declared pregnant women likely to receive, in one year from sources external to the body, a dose in excess of ten (10) percent of any of the applicable limits in subsections (e)(12) and (e)(13) of this section, and

(iii) Individuals entering a high or very high radiation area, and

(iv) Individuals working with medical fluoroscopic equipment;

.

(B) Each licensee or registrant shall monitor to determine compliance with subsection (e)(9) of this section, the occupational intake of radioactive material by and assess the committed effective dose equivalent to:

(i) Adults likely to receive, in one year, an intake in excess of ten (10) percent of the applicable ALI in Table I, Columns 1 and 2, of Appendix B, and

(ii) Minors and declared pregnant women likely to receive, in one year, a committed effective dose equivalent in excess of 0.5 mSv (0.05 rem);

(3) Location of individual monitoring devices. Each licensee or registrant shall ensure that individuals who are required to monitor occupational doses in accordance with subdivision (2)(A) of this subsection wear individual monitoring devices as follows:

(A) An individual monitoring device used for monitoring the dose to the whole body shall be worn at the unshielded location of the whole body likely to receive the highest exposure. When a protective apron is worn, the location of the individual monitoring device is typically at the neck (collar);

(B) An individual monitoring device used for monitoring the dose to an embryo/fetus of a declared pregnant woman, pursuant to subsection (e)(13) of this section, shall be located at the waist under any protective apron being worn by the woman;

(C) An individual monitoring device used for monitoring the lens dose equivalent, to demonstrate compliance with subsection (e)(1)(B)(i) of this section, shall be located at the neck (collar), outside any protective apron being worn by the monitored individual, or at an unshielded location closer to the eye;

(D) An individual monitoring device used for monitoring the dose to the extremities, to demonstrate compliance with subsection (e)(1)(B)(ii) of this section, shall be worn on the extremity likely to receive the highest exposure. Each individual monitoring device shall be oriented to measure the highest dose to the extremity being monitored, as appropriate to the use of the device; and

(E) When only one individual monitoring device is used to determine the effective dose equivalent for external radiation pursuant to subsection (e)(3)(B) of this section, it shall be located at the neck outside the protective apron. When a second individual monitoring device is used, for the same purpose, it shall be located under the protective apron at the waist. The second individual monitoring device is required for a declared pregnant woman.

(i) Control of exposure from external sources in restricted areas.

(1) Control of access to high radiation areas.

(A) Each licensee or registrant shall install and use at least one of the following measures at each entrance or access point to a high radiation area:

(i) A control device that, upon entry into the area, causes the level of radiation to be reduced below that level at which an individual might receive a deep dose equivalent of 1 mSv (0.1 rem) in one hour at 30 centimeters from the source of radiation or from any surface that the radiation penetrates,

(ii) A control device that energizes a conspicuous visible or audible alarm signal so that the individual entering the high radiation area and the supervisor of the activity are made aware of the entry, or

(iii) Entryways that are locked, except during periods when access to the areas is required, with positive control over each individual entry;

(B) In place of the controls required by subparagraph (A) of this subdivision for a high radiation area, the licensee or registrant may substitute continuous direct or electronic surveillance that is capable of preventing unauthorized entry;

(C) The licensee or registrant may apply to the Commissioner for approval of alternative methods for controlling access to high radiation areas pursuant to subparagraphs (A) and (B) of this subdivision;

(D) The licensee or registrant shall establish controls such as an emergency exit door required by subparagraphs (A) and (C) of this subdivision in a way that does not prevent individuals from leaving a high radiation area;

(E) The licensee or registrant is not required to control each entrance or access point to a room or other area that is a high radiation area solely because of the presence of radioactive materials prepared for transport and packaged and labeled in accordance with the regulations of the Department of Transportation provided that:

(i) The packages do not remain in the area longer than three days, and

(ii) The dose rate at one meter from the external surface of any package does not exceed 0.1 mSv (0.01 rem) per hour;

(F) The licensee or registrant is not required to control entrance or access to rooms or other areas in hospitals solely because of the presence of patients containing radioactive material, provided that there are personnel in attendance who are taking the necessary precautions to prevent the exposure of individuals to radiation or radioactive material in excess of the established limits in this section and to operate within the ALARA provisions of the licensee's or registrant's radiation protection program; and

(G) The registrant is not required to control entrance or access to rooms or other areas containing sources of radiation capable of producing a high radiation area as described in subdivision (1) of this subsection if the registrant has met all the specific requirements for access and control specified in other applicable sections of the Regulations of Connecticut State Agencies established under section 22a-153 of the Connecticut General Statutes.

(2) Control of access to very high radiation areas.

(A) In addition to implementing the requirements in subdivision (1) of this subsection, the licensee or registrant shall institute measures to ensure that an individual is not able to gain unauthorized or inadvertent access to areas in which radiation levels could be encountered at five (5) Gy (500 rad) or more in one hour at one meter from a source of radiation or any surface through which the radiation penetrates. This requirement does not apply to rooms or areas in which diagnostic x-ray systems are the only source of radiation, or to non-self-shielded irradiators;

(B) The registrant is not required to control entrance or access to rooms or other areas containing sources of radiation capable of producing a very high radiation area as described in subparagraph (A) of this subdivision if the registrant has met all the specific requirements for access and control specified in other applicable sections of the Regulations of Connecticut State Agencies established under section 22a-153 of the Connecticut General Statutes.

(3) Control of access to very high radiation areas with irradiators.

(A) This subdivision applies to licensees or registrants with sources of radiation in non-self-shielded irradiators. This subdivision does not apply to completely self-shielded irradiators in which the source of radiation is both stored and operated within the same shielding radiation barrier and, in the designed configuration of the irradiator, is always physically inaccessible to any individual and cannot create high levels of radiation in an area that is accessible to any individual and are used in:

(i) Teletherapy, or

(ii) Industrial radiography;

(B) In each area in which radiation levels may exceed five Gy (500 rad) in one hour at one meter from a source of radiation used to irradiate materials, the licensee or registrant shall meet the following requirements:

(i) Equip each entrance or access point with entry control devices which:

(a) Function automatically to prevent any individual from inadvertently entering a very high radiation area,

(b) Permit deliberate entry into the area only after a control device is actuated that causes the radiation level within the area, from the source of radiation, to be reduced below that at which it would be possible for an individual to receive a deep dose equivalent in excess of 1 mSv (0.1 rem) in one hour, and

(c) Prevent operation of the source of radiation if it would produce radiation levels in the area that could result in a deep dose equivalent to an individual in excess of 1 mSv (0.1 rem) in one hour;

(ii) Provide additional control devices shall be provided so that, upon failure of the entry control devices to function as required by subparagraph (B)(i) of this subdivision:

(a) The radiation level within the area, from the source of radiation, is reduced below that at which it would be possible for an individual to receive a deep dose equivalent in excess of 1 mSv (0.1 rem) in 1 hour, and

(b) Conspicuous visible and audible alarm signals are generated to make an individual attempting to enter the area aware of the hazard and at least one other authorized individual, who is physically present, familiar with the activity, and prepared to render or summon assistance, aware of the failure of the entry control devices;

(iii) Provide control devices so that, upon failure or removal of physical radiation barriers other than the sealed source's shielded storage container:

(a) The radiation level from the source of radiation is reduced below that at which it would be possible for an individual to receive a deep dose equivalent in excess of 1 mSv (0.1 rem) in one hour, and

(b) Conspicuous visible and audible alarm signals are generated to make potentially affected individuals aware of the hazard and the licensee or registrant or at least one other individual, who is familiar with the activity and prepared to render or summon assistance, aware of the failure or removal of the physical barrier;

(iv) When the shield for stored sealed sources is a liquid, provide means to monitor the integrity of the shield and to signal, automatically, loss of adequate shielding;

(v) Physical radiation barriers that comprise permanent structural components, such as walls, that have no credible probability of failure or removal in ordinary circumstances need not meet the requirements of subparagraphs (B)(iii) and (B)(iv) of this subdivision;

(vi) Equip each area with devices that will automatically generate conspicuous visible and audible alarm signals to alert personnel in the area before the source of radiation can be put into operation and in time for any individual in the area to operate a clearly identified control device, which must be installed in the area and which can prevent the source of radiation from being put into operation;

(vii) Control each area with administrative procedures and devices as necessary to ensure that the area is cleared of personnel prior to each use of the source of radiation;

(viii) Check each area by a radiation measurement to ensure that, prior to the first individual's entry into the area after any use of the source of radiation, the radiation level from the source of radiation in the area is below that at which it would be possible for an individual to receive a deep dose equivalent in excess of 1 mSv (0.1 rem) in one hour;

(ix) Test the entry control devices required in subparagraph (B)(i) of this subdivision for proper functioning as follows:

(a) Testing shall be conducted prior to initial operation with the source of radiation on any day, unless operations were continued uninterrupted from the previous day,

(b) Testing shall be conducted prior to resumption of operation of the source of radiation after any unintentional interruption, and

(c) The licensee or registrant shall submit and adhere to a schedule for periodic tests of the entry control and warning systems;

(x) Refrain from conducting operations, other than those necessary to place the source of radiation in safe condition or to effect repairs on controls, unless control devices are functioning properly; and

(xi) Control entry and exit portals used in transporting materials to and from the irradiation area, and that are not intended for use by individuals, devices and administrative procedures as necessary to physically protect and warn against inadvertent entry by any individual through such portals. Exit portals for irradiated materials shall be equipped to detect and signal the presence of any loose radioactive material that is carried toward such an exit and automatically to prevent loose radioactive material from being carried out of the area.

(C) Licensees, registrants or applicants for licenses or registrations for sources of radiation subject to subparagraph (B) of this subdivision which will be used in a

variety of positions or in locations, such as open fields or forests, that make it impracticable to comply with certain requirements of subparagraph (B) of this subdivision, such as those for the automatic control of radiation levels, may apply to the Commissioner for approval of alternative safety measures. Alternative safety measures shall provide personnel protection at least equivalent to those specified in subparagraph (B) of this subdivision. At least one of the alternative measures shall include an entry-preventing interlock control based on a measurement of the radiation that ensures the absence of high radiation levels before an individual can gain access to the area where such sources of radiation are used;

(D) The entry control devices required by subparagraphs (B) and (C) of this subdivision shall be established in such a way that no individual will be prevented from leaving the area.

(1) Use of Process or Other Engineering Controls. Each licensee or registrant shall use, to the extent practical, process or other engineering controls, including but not limited to, containment, decontamination or ventilation, to control the concentration of radioactive material in air.

(2) Use of other controls.

(A) When it is not practical to apply process or other engineering controls to control the concentrations of radioactive material in air to values below those that define an airborne radioactivity area, the licensee or registrant shall, consistent with maintaining the total effective dose equivalent ALARA, increase monitoring and limit intakes by one or more of the following means:

(i) Control of access,

(ii) Limitation of exposure times,

(iii) Use of respiratory protection equipment, or

(iv) Other controls; and

(B) If the licensee performs an ALARA analysis to determine whether or not respirators should be used, the licensee or registrant may consider safety factors other than radiological factors. The licensee or registrant should also consider the impact of respirator use on workers' industrial health and safety.

(3) Use of individual respiratory protection equipment. If a licensee or registrant assigns or permits the use of respiratory protection equipment to limit the intake of radioactive material, such licensee or registrant shall meet the requirements of this subdivision, as follows:

(A) The licensee or registrant shall use only respiratory protection equipment that is tested and certified by NIOSH, except as otherwise provided in this subdivision;

(B) A licensee or registrant may use equipment that has not been tested or certified by NIOSH, or for which there is no schedule for testing or certification extended by NIOSH, provided the licensee or registrant has an application approved by the Commissioner for authorized use of such equipment. The application must include evidence that the material and performance characteristics of the equipment are capable of providing the proposed degree of protection under anticipated conditions of use, including a demonstration by licensee testing or on the basis of reliable test information;

(C) The licensee or registrant shall implement and maintain a respiratory protection program that includes:

(i) Air sampling sufficient to identify the potential hazard, permit proper equipment selection and estimate doses,

(ii) Surveys and bioassays, as necessary, to evaluate actual intakes,

(iii) Testing of respirators for operability by performing a user seal check for face sealing devices and functional check for other devices immediately prior to each use;

(iv) Written procedures regarding the following:

(a) Monitoring, including air sampling and bioassays;

(b) Supervision and training of respirator users;

(c) Fit testing;

(d) Respirator selection;

(e) Breathing air quality;

(f) Inventory and control;

(g) Storage, issuance, maintenance, repair, testing, and quality assurance of respiratory protection equipment;

(h) Record keeping; and

(i) Limitations on periods of respirator use and relief from respirator use;

(v) Determination by a physician that the individual user is medically fit to use respiratory protection equipment prior to:

(a) The initial fitting of a face sealing respirator;

(b) The first field use of non-face sealing respirators, and

(c) Either every 12 months thereafter, or periodically at a frequency determined by a physician.

(vi) Fit testing, with fit factor " 10 times the APF for negative pressure devices, and a fit factor " 500 for any positive pressure, continuous flow, and pressure-demand devices, before the first field use of tight fitting, face-sealing respirators and periodically thereafter at a frequency not to exceed 1 year. Fit testing must be performed with the face piece operating in the negative pressure mode;

(D) The licensee shall advise each respirator user that the user may leave the area at any time for relief from respirator use in the event of equipment malfunction, physical or psychological distress, procedural or communication failure, significant deterioration of operating conditions or any other conditions that might require such relief;

(E) The licensee shall also consider limitations appropriate to the type and mode of use. When selecting respiratory devices the licensee shall provide for vision correction, adequate communication, low temperature work environments and the concurrent use of other safety or radiological protection equipment. The licensee shall use equipment in such a way as not to interfere with the proper operation of the respirator;

(F) Standby rescue persons are required whenever one-piece atmosphere-supplying suits, or any combination of supplied air respiratory protection device and personnel protective equipment are used from which an unaided individual would have difficulty extricating himself or herself. The standby persons must be equipped with respiratory protection devices or other apparatus appropriate for the potential hazards. The standby rescue persons shall observe or otherwise maintain continuous communication with the workers (visual, voice, signal line, telephone, radio or other suitable means) and be immediately available to assist them in case of a failure of the air supply or for any other reason that requires relief from distress. A sufficient number of standby rescue persons must be immediately available to assist all users of this type of equipment and to provide effective emergency rescue if needed;

(G) Atmosphere-supplying respirators must be supplied with respirable air of grade D quality or better as defined by the Compressed Gas Association in publication G-7.1, "Commodity Specification for Air," 1997 and included in the regulations of the Occupational Safety and Health Administration (29 CFR 1910.134(i)(1)(ii)(A) through (E);

(H) The licensee shall ensure that no objects, materials or substances, such as facial hair, or any conditions that interfere with the face-to-face piece seal or valve function, and that are under the control of the respirator wearer, are present between the skin of the wearer's face and the sealing surface of a tight-fitting respirator face piece; and

(I) In estimating the dose to individuals from intake of airborne radioactive materials, the concentration of radioactive material in the air that is inhaled when respirators

are worn is initially assumed to be the ambient concentration in air without respiratory protection, divided by the assigned protection factor. If the dose is later found to be greater than the estimated dose, the corrected value must be used. If the dose is later found to be less than the estimated dose, the corrected value may be used.

(4) The Commissioner may impose restrictions in addition to those in subdivisions (1) through (3) of this subsection and Appendix A of 10 CFR 20 in order to:

(A) Ensure that the respiratory protection program of a licensee is adequate to limit doses to individual from airborne radioactive material consistent with maintaining total effective dose equivalent ALARA; and

(B) Limit the extent to which a licensee may use respiratory protection equipment instead of process or other engineering controls.

(5) The licensee shall obtain authorization from the Commissioner before using assigned protection factors in excess of those specified in Appendix A to 10 CFR 20. The Commissioner may authorize a licensee to use higher assigned protection factors on receipt of an application that includes:

(A) A description of the situation for which a need exists for higher protection factors; and

(B) A demonstration that the respiratory protection equipment provides these higher protection factors under the proposed conditions of use.

(k) Storage and control of licensed or registered sources of radiation.

(1) The licensee or registrant shall secure licensed or registered radioactive material from unauthorized removal or access.

(2) The licensee or registrant shall maintain constant surveillance, or use devices or administrative procedures to prevent unauthorized use of licensed or registered radioactive material are in an unrestricted area and that are not in storage.

(3) The registrant shall use devices or administrative procedures to prevent unauthorized use of registered radiation machines.

(l) **Precautionary procedures.**

(1) Caution signs.

(A) Standard radiation symbol. : Each licensee or registrant shall use the following three-bladed design to label a source of radiation:

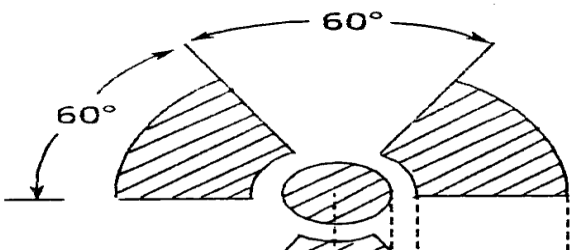

Figure 1. Radiation Symbol.

(B) Color requirements for standard radiation symbol.

(i) The color of the cross-hatched area in Figure 1 shall be magenta, purple or black and the background shall be yellow, and

(ii) Notwithstanding subdivision (1)(B)(i) of this subsection, a licensee or registrant may label sources, source holders or device components containing sources of radiation that are subject to high temperatures with conspicuously etched or stamped radiation caution symbols without a color requirement;

(C) Additional information on signs and labels. Each licensee or registrant may provide, on or near signs and labels required by this section, additional information, as appropriate, to make individuals aware of potential radiation exposures and to minimize the exposures.

(2) Posting requirements.

(A) Posting of radiation areas. The licensee or registrant shall post each radiation area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, RADIATION AREA" or "CAUTION, X-RAY," as appropriate;

(B) Posting of high radiation areas. The licensee or registrant shall post each high radiation area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, HIGH RADIATION AREA" or "DANGER, HIGH RADIATION AREA";

(C) Posting of very high radiation areas. The licensee or registrant shall post each very high radiation area as follows:

(i) Except as provided in subdivision (2)(C)(ii) of this subsection, with a conspicuous sign or signs bearing the radiation symbol and words "GRAVE DANGER, VERY HIGH RADIATION AREA," and

(ii) For areas in use in a medical facility where patient care is provided, a licensee or registrant may post such an area with a conspicuous sign or signs bearing the radiation symbol and words

"CAUTION, VERY HIGH RADIATION AREA" or
"DANGER, VERY HIGH RADIATION AREA;"

(D) Posting of airborne radioactivity areas. The licensee or registrant shall post each airborne radioactivity area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, AIRBORNE RADIOACTIVITY AREA" or "DANGER, AIRBORNE RADIOACTIVITY AREA;"

(E) Posting of areas or rooms in which licensed or registered material or a source of radiation is used or stored. The licensee or registrant shall post each area or room in which there is used or stored a source of radiation or an amount of radioactive material exceeding ten times the quantity of such material specified in Appendix C with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, RADIOACTIVE MATERIAL(S)" or "DANGER, RADIOACTIVE MATERIAL(S);"

(3) Exceptions to posting requirements.

(A) A licensee or registrant is not required to post caution signs in areas or rooms containing sources of radiation for periods of less than eight hours, if each of the following conditions is met:

(i) The sources of radiation are constantly attended during such periods by an individual who takes the precautions necessary to prevent the exposure of individuals to sources of radiation in excess of the limits established in this section, and

(ii) The area or room is subject to the licensee's or registrant's control;

(B) Rooms or other areas in hospitals that are occupied by patients are not required to be posted with caution signs pursuant to subsection (1)(2) of this section provided that the requirements of sections 22a-153-8(z) of the Regulations of Connecticut State Agencies are met:

(i) A patient being treated with a permanent implant could be released from confinement pursuant to section 22a-153- 8(z) of the Regulations of Connecticut State Agencies, or

(ii) A patient being treated with a therapeutic radiopharmaceutical could be released from confinement pursuant to section 22a-153- 8(z) of the Regulations of Connecticut State Agencies;

(C) A room or area is not required to be posted with a caution sign because of the presence of a sealed source provided the radiation level at 30 centimeters from the surface of the sealed source container or housing, or material equivalent to a sealed source, does not exceed 0.05 mSv (0.005 rem) per hour;

(F) A room or area is not required to be posted with a caution sign because of the presence of radiation machines used solely for diagnosis in the healing arts;

(G) A room in a hospital or clinic that is used for teletherapy is exempt from the requirement to be posted with caution signs, provided that:

(i) Access to the room is controlled pursuant to 10 CFR 35.615, and

(ii) Personnel in attendance take necessary precautions to prevent the inadvertent exposure of workers, other patients and member of the public to radiation in excess of the limits established in this section.

(4) Labeling containers and radiation machines.

(A) The licensee or registrant shall ensure that each container of licensed or registered material bears a durable, clearly visible label bearing the radiation symbol and the words "CAUTION, RADIOACTIVE MATERIAL" or "DANGER, RADIOACTIVE MATERIAL." The label shall also provide information that may include the radionuclides present, an estimate of the quantity of radioactivity, the date for which the activity is estimated, radiation levels and mass enrichment, to permit individuals handling or using the containers, or working in the vicinity of the containers, to take precautions to avoid or minimize exposures;

(B) Each licensee or registrant shall, prior to removal or disposal of empty uncontaminated containers to unrestricted areas, remove or deface the radioactive material label or otherwise clearly indicate that the container no longer contains radioactive materials;

(C) Each registrant shall ensure that each radiation machine is labeled in a conspicuous manner which cautions individuals that radiation is produced when it is energized;

(5) Exemptions to labeling requirements. A licensee or registrant is not required to label:

(A) Containers holding licensed or registered material in quantities less than the quantities listed in Appendix C; or

(B) Containers holding licensed or registered material in concentrations less than those specified in Table III of Appendix B; or

(C) Containers attended by an individual who takes the precautions necessary to prevent the exposure of individuals in excess of the limits established by this section;

(D) Containers when they are in transport and packaged and labeled in accordance with the regulations of the Department of Transportation in 40 CFR 173.403(m) and (w) and 40 CFR 173.421 through 173.424;

(E) Containers that are accessible only to individuals authorized to handle or use them, or to work in the vicinity of the containers, if the contents are identified to these individuals by a readily available written record. Examples of containers of this type are containers in locations such as water-filled canals, storage vaults or

hot cells. The record shall be retained as long as the containers are in use for the purpose indicated on the record; or

(F) Installed manufacturing or process equipment, such as piping and tanks.

(6) Procedures for receiving and opening packages.

(A) Each licensee or registrant who expects to receive a package containing quantities of radioactive material in excess of a Type A quantity shall make arrangements to receive:

(i) The package when the carrier offers it for delivery, or

(ii) The notification of the arrival of the package at the carrier's terminal and to take possession of the package expeditiously;

(B) Each licensee or registrant shall:

(i) Monitor the external surfaces of a package labeled as specified in 49 CFR 172.403 and 49 CFR 172.436-440 for radioactive contamination unless the package contains only radioactive material in the form of gas or in special form,

(ii) Monitor the external surfaces of a package labeled as specified in 49 CFR 172.403 and 172.436-440 for radiation levels unless the package contains quantities of radioactive material that are less than or equal to the Type A quantity, and

(iii) Monitor all packages known to contain radioactive material for radioactive contamination and radiation levels if there is evidence of degradation of package integrity, such as packages that are crushed, wet or damaged;

(C) Each licensee or registrant shall perform the monitoring required by subsection (l)(6)(B) of this section as soon as practicable after receipt of the package, but not later than three hours after the package is received at the licensee's or registrant's facility if it is received during the licensee's or registrant's normal working hours, or not later than three hours from the beginning of the next working day if it is received after working hours;

(D) The licensee or registrant shall immediately notify the final delivery carrier and, by telephone, telegram, mailgram or facsimile, the Commissioner when:

(i) Removable radioactive surface contamination exceeds the limits of 10 CFR 71.87(i), or

(ii) External radiation levels exceed the limits of 10 CFR 71.47;

(E) Each licensee or registrant shall:

(i) Establish, maintain and retain written procedures for safely opening packages in which radioactive material is received, and

(ii) Ensure that the procedures are followed and that due consideration is given to special instructions for the type of package being opened;

(F) Licensees or registrants transferring special form sources in vehicles owned or operated by the licensee or registrant to and from a work site are exempt from the contamination monitoring requirements of subsection (l)(6)(B) of this section but are not exempt from the monitoring requirement in subsection (l)(6)(B) of this section for measuring radiation levels to ensure that the remains properly lodged in its shield.

(m) Waste disposal.

(1) General requirements.

(A) A licensee or registrant shall dispose of radioactive licensed or registered material only as follows:

(i) By transfer to an authorized recipient as provided in subsection (m)(6) of this section or 10 CFR 30, 40, 60, 61, 63, 70 and 72,

(ii) By decay in storage;

(iii) By release in effluents within the limits in subsection (f) of this section, or

(iv) As authorized pursuant to . subdivisions (2) through (5) of this subsection;

(B) A person shall be specifically licensed or registered to receive waste containing radioactive material from other persons for:

(i) Treatment prior to disposal,

(ii) Treatment or disposal by incineration,

(iii) Decay in storage;

(iv) Disposal at a land disposal facility licensed pursuant to 10 CFR 61;

(v) Disposal at a geologic repository under 10 CFR 60 or 63; or

(vi) Storage until transferred to a storage or disposal facility authorized to receive the waste.

(2) Method for obtaining approval of proposed disposal procedures. A licensee or registrant or applicant for a license or registration may apply to the Commissioner for approval of proposed procedures, not otherwise authorized in this section, to dispose of licensed or registered material generated in the licensee's or registrant's operations. Each application shall include:

(A) A description of the waste containing licensed or registered material to be disposed of, including the physical and chemical properties that have an impact on risk evaluation, and the proposed manner and conditions of waste disposal;

(B) An analysis and evaluation of pertinent information on the nature of the environment;

(C) The nature and location of other potentially affected facilities under the control of the licensee or registrant; and

(D) Analyses and procedures to ensure that doses are maintained ALARA and within the dose limits in this section.

(3) Disposal by release into sanitary sewerage.

(A) A licensee or registrant may discharge licensed or registered material into sanitary sewerage if each of the following conditions is satisfied:

(i) The material is readily soluble, or is readily dispersible biological material, in water,

(ii) The quantity of licensed or registered material that the licensee or registrant releases into the sewer in one month divided by the average monthly volume of water released into the sewer by the licensee or registrant does not exceed the concentration listed in Table III of Appendix B, and

(iii) If more than one radionuclide is released, the following conditions must also be satisfied:

(a) The licensee or registrant shall determine the fraction of the limit in Table III of Appendix B represented by discharges into sanitary sewerage by dividing the actual monthly average concentration of each radionuclide released by the licensee or registrant into the sewer by the concentration of that radionuclide listed in Table III of Appendix B; and

(b) The sum of the fractions for each radionuclide required by subdivision (3)(A)(iii)(a) of this section does not exceed unity; and

(iv) The total quantity of radioactive material that the licensee or registrant releases into the sanitary sewerage in a year does not exceed 185 GBq (5 Ci) of hydrogen-3, 37 GBq (1 Ci) of carbon-14 and 37 GBq (1 Ci) of all other radioactive materials combined;

(B) Excreta from individuals undergoing medical diagnosis or therapy with radioactive material are not subject to the limitations contained in subdivision (3)(A) of this section.

(4) Treatment or disposal by incineration. A licensee or registrant may treat or dispose of licensed or registered material by incineration only in the form and concentration specified in subsection (m)(5) of this section or as specifically approved by the Commissioner pursuant to subsection (m)(2) of this section.

(5) Disposal of specific wastes.

(A) A licensee or registrant may dispose of the licensed or registered material as if it were not radioactive:

(i) 1.85 kBq (0.05 μCi), or less, of hydrogen-3 or carbon-14 per gram of medium used for liquid scintillation counting, and

(ii) 1.85 kBq (0.05 μCi), or less, of hydrogen-3 or carbon-14 per gram of animal tissue, averaged over the weight of the entire animal;

(B) A licensee or registrant shall not dispose of tissue pursuant to . subsection (m)(5)(A)(ii) of this section in a manner that would permit its use either as food for humans or as animal feed;

(C) The licensee or registrant shall maintain records in accordance with subsection (n)(9) of this section;

(6) Transfer for disposal and manifests.

(A) The requirements of this subdivision and Appendix D are designed to control transfers of low-level radioactive waste intended for disposal at a licensed low-level radioactive waste disposal facility, establish a manifest tracking system and supplement existing requirements concerning transfers and recordkeeping for those wastes;

(B) Each shipment of radioactive waste designated for disposal at a licensed low-level radioactive waste disposal facility shall be accompanied by a shipment manifest as specified in Appendix D.I;

(C) Each shipment manifest shall include a certification by the waste generator as specified in Appendix D.II;

(D) Each person involved in the transfer of waste for disposal or in the disposal of waste, including the waste generator, waste collector, waste processor and disposal facility operator, shall comply with the requirements specified in Appendix D.III.

(7) Compliance with environmental and health protection regulations. Nothing in subsections (m)(1) through (m)(6) of this section relieves the licensee or registrant from complying with other applicable Federal, State and local regulations governing any other toxic or hazardous properties of materials that may be disposed of to pursuant to subsections (m)(1) through (m)(6) of this section.

(n) Records.

(1) General provisions.

(A) Each licensee or registrant shall use the SI units becquerel, gray, sievert and coulomb per kilogram, or the special units curie, rad, rem and roentgen, including multiples and subdivisions, and shall clearly indicate the units of all quantities on records required by this section;

(B) The licensee or registrant shall make a clear distinction among the quantities entered on the records required by this section, such as, total effective dose equivalent, total organ dose equivalent, shallow dose equivalent, lens dose equivalent, deep dose equivalent or committed effective dose equivalent;

(2) Records of radiation protection programs.

(A) Each licensee or registrant shall maintain records of the radiation protection program, including:

(i) The provisions of the program, and

(ii) Audits and other reviews of program content and implementation;

(B) The licensee or registrant shall retain the records required by subsection (n)(2)(A)(i) of this section until the Commissioner terminates each pertinent license or registration requiring the record. The licensee or registrant shall retain the records required by subsection (n)(2)(A)(ii) of this section for five years after the record is made.

(3) Records of surveys.

(A) Each licensee or registrant shall maintain records showing the results of surveys and calibrations required by subsections (h)(1) and (l)(6)(B) of this section. The licensee or registrant shall retain these records for five years after the record is made;

(B) The licensee or registrant shall retain each of the following records until the Commissioner terminates each pertinent license or registration requiring the record:

(i) Records of the results of surveys to determine the dose from external sources of radiation used, in the absence of or in combination with individual monitoring data, in the assessment of individual dose equivalents,

(ii) Records of the results of measurements and calculations used to determine individual intakes of radioactive material and used in the assessment of internal dose,

(iii) Records showing the results of air sampling, surveys, and bioassays required pursuant to subsection (j)(3)(C) of this section, and

(iv) Records of the results of measurements and calculations used to evaluate the release of radioactive effluents to the environment;

(C) Upon termination of the license or registration, the licensee or registrant shall permanently store records on **Agency Form Y** or equivalent or shall make provision with the Commissioner for transfer to the Commissioner.

(4) Records of tests for leakage or contamination of sealed sources. Records of tests for leakage or contamination of sealed sources required by this section shall be kept in units of becquerel or microcurie and maintained for inspection by the Commissioner for five years after the records are made.

(5) Records of prior occupational dose.

(A) The licensee or registrant shall retain the records of prior occupational dose and exposure history as specified in subsection (e)(10) of this section on **Agency Form Y** or equivalent until the Commissioner terminates each pertinent license or registration requiring this record. The licensee or registrant shall retain records used in preparing **Agency Form Y** or equivalent for five years after the record is made;

(B) Upon termination of the license or registration, the licensee or registrant shall permanently store records on **Agency Form Y** or equivalent, or shall make provision with the Commissioner for transfer to the Commissioner;

(6) Records of planned special exposures.

(A) For each use of the provisions of subsection (e)(11) of this section for planned special exposures, the licensee or registrant shall maintain records that describe:

(i) The exceptional circumstances requiring the use of a planned special exposure;

(ii) The name of the management official who authorized the planned special exposure and a copy of the signed authorization,

(iii) What actions were necessary,

(iv) Why the actions were necessary,

(v) What precautions were taken to assure that doses were maintained ALARA,

(vi) What individual and collective doses were expected to result, and

(vii) The doses actually received in the planned special exposure;

(B) The licensee or registrant shall retain the records until the Commissioner terminates each pertinent license or registration requiring these records;

(C) Upon termination of the license or registration, the licensee or registrant shall permanently store records on **Agency Form Y** or equivalent, or shall make provision with the Commissioner for transfer to the Commissioner.

(7) Records of individual monitoring results.

(A) Recordkeeping requirement. Each licensee or registrant shall maintain records of doses received by all individuals for whom monitoring was required pursuant to subsection (h)(2) of this section, and records of doses received during planned special exposures, accidents and emergency conditions. These records shall include, as applicable:

(i) The deep dose equivalent to the whole body, lens dose equivalent, shallow dose equivalent to the skin and shallow dose equivalent to the extremities,

(ii) The estimated intake of radionuclides,

(iii) The committed effective dose equivalent assigned to the intake of radionuclides,

(iv) The specific information used to calculate the committed effective dose equivalent pursuant to subsection (e)(9)(C) of this section,

(v) The total effective dose equivalent when required by subsection (e)(7) of this section, and

(vi) The total of the deep dose equivalent and the committed dose to the organ receiving the highest total dose;

(B) Recordkeeping frequency. The licensee or registrant shall make entries of the records specified in subsection (n)(7)(A) of this section annually at intervals not to exceed thirteen months;

(C) Recordkeeping format. The licensee or registrant shall maintain the records specified in subsection (n)(7)(A) of this section on Agency Form Z, in accordance with the instructions for Agency Form Z, or in clear and legible records containing all the information required by Agency Form Z**;**

(D) The licensee or registrant shall maintain the records of dose to an embryo/fetus with the records of dose to the declared pregnant woman. The declaration of pregnancy, including the estimated date of conception, shall also be kept on file, but may be maintained separately from the dose records;

(E) The licensee or registrant shall retain each required form or record until the Commissioner terminates each pertinent license or registration requiring the record.

(8) Records of dose to individual members of the public.

(A) Each licensee or registrant shall maintain records sufficient to demonstrate compliance with the dose limit for individual members of the public;

(B) The licensee or registrant shall retain the records required by subsection (n)(8)(A) of this section until the Commissioner terminates each pertinent license or registration requiring the record.

(9) Records of waste disposal.

(A) Each licensee or registrant shall maintain records of the disposal of licensed or registered materials made pursuant to section 22a-165d of the Connecticut General Statutes or subsections (m)(1) through (m)(5) of this section;

(B) The licensee or registrant shall retain the records required by subsection (n)(9)(A) of this section until the Commissioner terminates each pertinent license or registration requiring the record;

(10) Records of testing of entry control devices for very high radiation areas.

(A) Each licensee or registrant shall maintain records of tests made pursuant to subsection (i)(3)(B)(ix) of this section on entry control devices for very high radiation areas. These records shall include the date, time and results of each such test of function;

(B) The licensee or registrant shall retain the records required by subsection (n)(10)(A) of this section for five years after the record is made.

(11) Form of records.

(A) Each record required by this section shall be legible throughout the specified retention period;

(B) Records, such as letters, drawings and specifications, shall include all pertinent information, including stamps, initials and signatures;

(C) Each record shall be the paper original or a reproduced copy; a microform copy, provided that the copy or microform is authenticated by authorized personnel and that the microform is capable of producing a clear copy throughout the required retention period; or an electronic copy capable of producing accurate and complete records during the required retention period;

(D) The licensee shall maintain adequate safeguards against tampering with and loss of records.

(o) Reporting.

(1) Reports of stolen, lost or missing sources of radiation.

(A) Telephone reports. Each licensee or registrant shall report to the Commissioner by telephone the following occurrences in the designated times:

(i) Lost, stolen or missing radioactive material in an aggregate quantity equal to or greater than 1,000 times the quantity specified in [**Appendix C]** under such circumstances that it appears to the licensee or registrant that an exposure could result to individuals in unrestricted areas, immediately after its occurrence becomes known to the licensee or registrant, or

(ii) Lost, stolen or missing radioactive material in an aggregate quantity greater than ten times the quantity specified in **[Appendix C],** within thirty days after its occurrence becomes known to the licensee or registrant if such material is still missing, and

(iii) A lost, stolen or missing radiation machine, immediately after its occurrence becomes known to the registrant;

(B) Written reports. Each licensee or registrant required to make a report pursuant to subsection (o)(1)(A) of this section shall, within thirty days after making the telephone report, submit to the Commissioner a written report including the following information:

(i) A description of the source of radiation involved, including, for radioactive material, the kind, quantity and chemical and physical form; and, for radiation machines, the manufacturer, model and serial number, type and maximum energy of radiation emitted,

(ii) A description of the circumstances under which the loss or theft occurred,

(iii) A statement of disposition, or probable disposition, of the source of radiation involved,

(iv) Exposures of individuals to radiation, circumstances under which the exposures occurred, and the possible total effective dose equivalent to persons in unrestricted areas,

(v) Actions that have been taken, or will be taken, to recover the source of radiation, and

(vi) Procedures or measures that have been, or will be, adopted to ensure against a recurrence of the loss or theft of sources of radiation;

(C) Subsequent to filing the written report, the licensee or registrant shall also report additional substantive information as required by the Commissioner on a loss or theft within thirty days after the licensee or registrant learns of such information;

(D) The licensee or registrant shall prepare any report filed with the Commissioner pursuant to this subdivision and shall include names of individuals who may have received exposure to radiation in a separate and detachable portion of the report.

(2) Notification of incidents.

(A) Immediate notification. Notwithstanding other requirements for notification pursuant to this section, each licensee or registrant shall immediately report each event involving a source of radiation possessed by the licensee or registrant that may have caused or threatens to cause any of the following conditions:

(i) An individual to receive:

(a) A total effective dose equivalent of 0.25 Sv (25 rem) or more,

(b) An lens dose equivalent of 0.75 Sv (75 rem) or more, or

(c) A shallow dose equivalent to the skin or extremities or a total organ dose equivalent of 2.5 Gy (250 rad) or more; or

(ii) The release of radioactive material, inside or outside of a restricted area, so that, had an individual been present for 24 hours, the individual could have received an intake five times the occupational ALI. This provision does not apply to locations where personnel are not normally stationed during routine operations, such as hot-cells or process enclosures.

(B) Twenty-four hour notification. Each licensee or registrant shall, within 24 hours of discovery of the event, report to the Commissioner each event involving loss of control of a licensed or registered source of radiation possessed by the licensee or registrant that may have caused, or threatens to cause, any of the following conditions:

(i) An individual to receive, in a period of 24 hours:

(a) A total effective dose equivalent exceeding 0.05 Sv (5 rem);

(b) An lens dose equivalent exceeding 0.15 Sv (15 rem); or

(c) A shallow dose equivalent to the skin or extremities or a total organ dose equivalent exceeding 0.5 Sv (50 rem); or

(ii) The release of radioactive material, inside or outside of a restricted area, so that, had an individual been present for 24 hours, the individual could have received an intake in excess of one occupational ALI. This provision does not apply to locations where personnel are not normally stationed during routine operations, such as hot-cells or process enclosures;

(C) Licensees or registrants shall make the reports required by subsections (o)(2)(A) and (o)(2)(B) of this section by initial contact by telephone to the Commissioner and shall confirm the initial contact by telegram, mailgram or facsimile to the Commissioner;

(D) The licensee or registrant shall prepare each report filed with the Commissioner pursuant to subsection (o)(2) of this section so that names of individuals who have received exposure to sources of radiation are stated in a separate and detachable portion of the report;

(E) The provisions of subsection (o)(2) of this section do not apply to doses that result from planned special exposures, provided such doses are within the limits for planned special exposures and are reported pursuant to subsection (o)(4) of this section.

(3) Reports of exposures, radiation levels and concentrations of radioactive material exceeding the limits.

(A) Reportable events. In addition to the notification required by subsection (o)(2) of this section, each licensee or registrant shall submit a written report within thirty days after learning of any of the following occurrences:

(i) Incidents for which notification is required by subsection (o)(2) of this section, or

(ii) Doses in excess of any of the following:

(a) The occupational dose limits for adults in subsections (c)(1) through (e)(6) of this section,

(b) The occupational dose limits for a minor in subsection (e)(12) of this section,

(c) The limits for an embryo/fetus of a declared pregnant woman in subsection (e)(13) of this section,

(d) The limits for an individual member of the public in subsection (f)(1) of this section, or

(e) Any applicable limit in the license or registration; or

(iii) Levels of radiation or concentrations of radioactive material in:

(a) A restricted area in excess of applicable limits in the license or registration, or

(b) An unrestricted area in excess of ten times the applicable limit set forth in this section or in the license or registration, whether or not involving exposure of any individual in excess of the limits in subsection (f)(1) of this section; or

(iv) For licensees subject to the provisions of the Environmental Protection Commissioner's generally applicable environmental radiation standards in 40 CFR 190, levels of radiation or releases of radioactive material in excess of those standards, or of license conditions related to those standards.

(B) Contents of reports.

(i) Each report required by subsection (o)(3)(A) of this section shall describe the extent of exposure of individuals to radiation and radioactive material, including, as appropriate:

(a) Estimates of each individual's dose,

(b) The levels of radiation and concentrations of radioactive material involved,

(c) The cause of the elevated exposures, dose rates or concentrations; and

(d) Corrective steps taken or planned to ensure against a recurrence, including the schedule for achieving conformance with applicable limits, generally applicable environmental standards, and associated license or registration conditions.

(ii) Each report filed pursuant to subsection (o)(3)(A) of this section shall include for each individual exposed: the name, Social Security account number and date of birth. With respect to the limit for the embryo/fetus in subsection (e)(13) of this section, the identifiers should be those of the declared pregnant woman. The report shall be prepared so that this information is stated in a separate and detachable portion of the report.

(C) All licensees or registrants who make reports pursuant to subsection (o)(3)(A) of this section shall submit the report in writing to the Commissioner.

(4) Reports of planned special exposures. The licensee or registrant shall submit a written report to the Commissioner within thirty days following any planned special exposure conducted in accordance with subsection (e)(11) of this section, informing the Commissioner that a planned special exposure was conducted and indicating the date the planned special exposure occurred and the information required by subsection (n)(6) of this section.

(5) Reports of Individual Monitoring.

(A) This section applies to each person licensed or registered by the Commissioner to:

(i) Possess or use sources of radiation for purposes of industrial radiography pursuant to section 22a-153-3 of the Regulations of Connecticut State Agencies, or

(ii) Possess or use at any time, for processing or manufacturing for distribution pursuant to section 22a-153-8 of the Regulations of Connecticut State Agencies, radioactive material in quantities exceeding any one of the quantities in Table 2(o):

Table 2(o)

Radionuclide	Activity

	Ci	GBq
Cesium-137	1	37
Cobalt-60	1	37
Gold-198	100	3,700
Iodine-131	1	37
Iridium-192	10	370
Krypton-85	1,000	37,000
Promethium-147	10	370
Technetium-99m	1,000	37,000

(B) Each licensee or registrant in a category listed in subparagraph (A) of this subdivision shall submit an annual report of the results of individual monitoring carried out by the licensee or registrant for each individual for whom monitoring was required by subsection (h)(2) of this section during that year. The licensee or registrant may include additional data for individuals for whom monitoring was provided but not required. The licensee or registrant shall use Agency Form Z or equivalent or electronic media containing all the information required by Agency Form Z; and

(C) The licensee or registrant shall file the report required by subparagraph (B) of this subdivision, covering the preceding year, on or before April 30 of each year. The licensee or registrant shall submit the report to the Commissioner.

(6) Notifications and reports to individuals.

(A) Requirements for notification and reports to individuals of exposure to radiation or radioactive material are specified in 22a-153-6(5)(2)(c);

(B) When a licensee or registrant is required pursuant to subsection (o)(3) of this section to report to the Commissioner any exposure of an individual to radiation or radioactive material, the licensee or registrant shall also notify the individual. Such notice shall be transmitted at a time not later than the transmittal to the Commissioner, and shall comply with the provisions of 22a-153-6(5)(2)(c)(1).

(7) Reports of leaking or contaminated sealed sources. The licensee or registrant shall file a report within five days with the Commissioner if the test for leakage or contamination required pursuant to subsection (g) of this section indicates a sealed source is leaking or contaminated. The report shall include the equipment involved, the test results and the corrective action taken.

(p) Vacating premises.

Each specific licensee or registrant shall, no less than 90 days before vacating or relinquishing possession or control of premises which may have been contaminated with radioactive material as a result of his activities, notify the Commissioner in writing of intent to

vacate. When deemed necessary by the Commissioner, the licensee shall decontaminate the premises in such a manner as the Commissioner may specify.

Statement of Purpose: This section establishes standards for protection against ionizing radiation resulting from activities conducted pursuant to licenses or registrations issued by the Department. The requirements of the section are designed to control the receipt, possession, use, transfer and disposal of sources of radiation by any licensee or registrant so the total dose to an individual, including doses resulting from all sources of radiation other than background radiation, does not exceed the prescribed standards.